

Math

27 QUESTIONS

DIRECTIONS

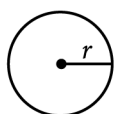
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

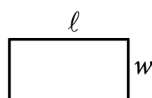
- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

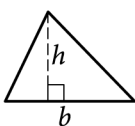


$$A = \pi r^2$$

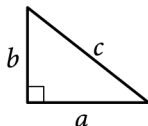
$$C = 2\pi r$$



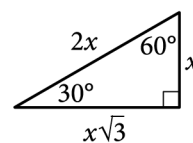
$$A = \ell w$$



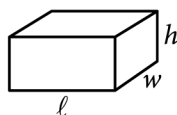
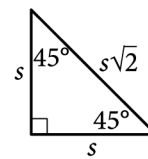
$$A = \frac{1}{2}bh$$



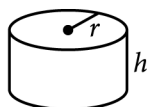
$$c^2 = a^2 + b^2$$



Special Right Triangles



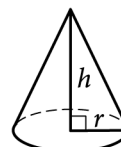
$$V = \ell wh$$



$$V = \pi r^2 h$$



$$V = \frac{4}{3}\pi r^3$$



$$V = \frac{1}{3}\pi r^2 h$$



$$V = \frac{1}{3}\ell wh$$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is 2π .

The sum of the measures in degrees of the angles of a triangle is 180.

For multiple-choice questions, solve each problem, choose the correct answer from the choices provided, and then circle your answer in this book. Circle only one answer for each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer circled, or for questions with no answers circled.

For student-produced response questions, solve each problem and write your answer next to or under the question in the test book as described below.

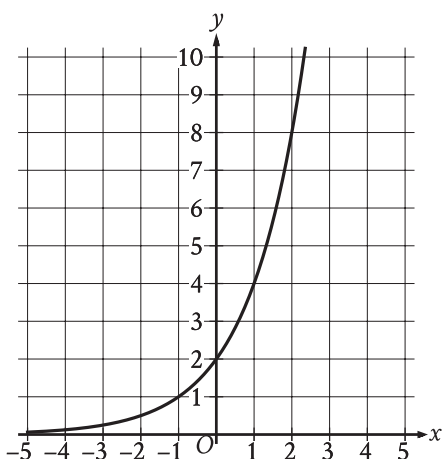
- Once you've written your answer, circle it clearly. You will not receive credit for anything written outside the circle, or for any questions with more than one circled answer.
- If you find **more than one correct answer**, write and circle only one answer.
- Your answer can be up to 5 characters for a **positive** answer and up to 6 characters (including the negative sign) for a **negative** answer, but no more.
- If your answer is a **fraction** that is too long (over 5 characters for positive, 6 characters for negative), write the decimal equivalent.
- If your answer is a **decimal** that is too long (over 5 characters for positive, 6 characters for negative), truncate it or round at the fourth digit.
- If your answer is a **mixed number** (such as $3\frac{1}{2}$), write it as an improper fraction ($\frac{7}{2}$) or its decimal equivalent (3.5).
- Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

1

Isabel grows potatoes in her garden. This year, she harvested 760 potatoes and saved 10% of them to plant next year. How many of the harvested potatoes did Isabel save to plant next year?

- A) 66
- B) 76
- C) 84
- D) 86

2



What is the y -intercept of the graph shown?

- A) (0, 0)
- B) (0, 2)
- C) (2, 0)
- D) (2, 2)

3

What length, in centimeters, is equivalent to a length of 51 meters? (1 meter = 100 centimeters)

- A) 0.051
- B) 0.51
- C) 5,100
- D) 51,000

4

A bus is traveling at a constant speed along a straight portion of road. The equation $d = 30t$ gives the distance d , in feet from a road marker, that the bus will be t seconds after passing the marker. How many feet from the marker will the bus be 2 seconds after passing the marker?

- A) 30
- B) 32
- C) 60
- D) 90

5

Which expression is equivalent to $20w - (4w + 3w)$?

- A) $10w$
- B) $13w$
- C) $19w$
- D) $21w$

6

If $6 + x = 9$, what is the value of $18 + 3x$?

7

$$y = x^2 - 14x + 22$$

The given equation relates the variables x and y .
For what value of x does the value of y reach its minimum?

8

Which expression is equivalent to $9x^2 + 5x$?

- A) $x(9x + 5)$
- B) $5x(9x + 1)$
- C) $9x(x + 5)$
- D) $x^2(9x + 5)$

9

In triangle ABC , the measure of angle B is 52° and the measure of angle C is 17° . What is the measure of angle A ?

- A) 21°
- B) 35°
- C) 69°
- D) 111°

10

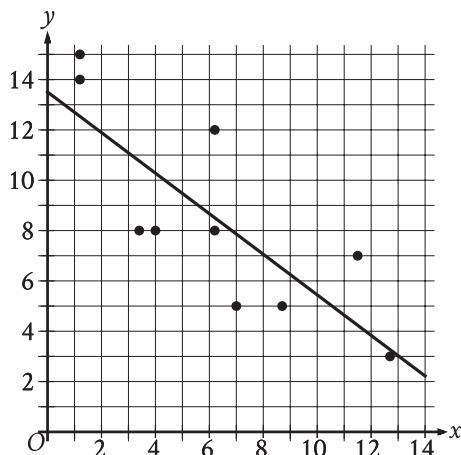
$$\begin{aligned}x &= 8 \\ y &= x^2 + 8\end{aligned}$$

The graphs of the equations in the given system of equations intersect at the point (x, y) in the xy -plane. What is the value of y ?

- A) 8
- B) 24
- C) 64
- D) 72

11

The scatterplot shows the relationship between two variables, x and y . A line of best fit is also shown.



Which of the following equations best represents the line of best fit shown?

- A) $y = 13.5 + 0.8x$
- B) $y = 13.5 - 0.8x$
- C) $y = -13.5 + 0.8x$
- D) $y = -13.5 - 0.8x$

12

The function f is defined by $f(x) = 8\sqrt{x}$. For what value of x does $f(x) = 48$?

- A) 6
- B) 8
- C) 36
- D) 64

13

A circle has center O , and points R and S lie on the circle. In triangle ORS , the measure of $\angle ROS$ is 88° . What is the measure of $\angle RSO$, in degrees?

14

$$x(x + 1) - 56 = 4x(x - 7)$$

What is the sum of the solutions to the given equation?

15

$$\begin{aligned} y &= 3x \\ 2x + y &= 12 \end{aligned}$$

The solution to the given system of equations is (x, y) . What is the value of $5x$?

- A) 24
- B) 15
- C) 12
- D) 5

16

A cube has an edge length of 41 inches. What is the volume, in cubic inches, of the cube?

- A) 164
- B) 1,681
- C) 10,086
- D) 68,921

17

$$p(t) = 90,000(1.06)^t$$

The given function p models the population of Lowell t years after a census. Which of the following functions best models the population of Lowell m months after the census?

- A) $r(m) = \frac{90,000}{12}(1.06)^m$
- B) $r(m) = 90,000\left(\frac{1.06}{12}\right)^m$
- C) $r(m) = 90,000\left(\frac{1.06}{12}\right)^{\frac{m}{12}}$
- D) $r(m) = 90,000(1.06)^{\frac{m}{12}}$

18

$$6x + 7y = 28$$

$$2x + 2y = 10$$

The solution to the given system of equations is (x, y) . What is the value of y ?

- A) -2
- B) 7
- C) 14
- D) 18

19

The minimum value of x is 12 less than 6 times another number n . Which inequality shows the possible values of x ?

- A) $x \leq 6n - 12$
- B) $x \geq 6n - 12$
- C) $x \leq 12 - 6n$
- D) $x \geq 12 - 6n$

20

Data set A consists of the heights of 75 buildings and has a mean of 32 meters. Data set B consists of the heights of 50 buildings and has a mean of 62 meters. Data set C consists of the heights of the 125 buildings from data sets A and B. What is the mean, in meters, of data set C?

21

The graph of $9x - 10y = 19$ is translated down 4 units in the xy -plane. What is the x -coordinate of the x -intercept of the resulting graph?

22

Two variables, x and y , are related such that for each increase of 1 in the value of x , the value of y increases by a factor of 4. When $x = 0$, $y = 200$. Which equation represents this relationship?

- A) $y = 4(x)^{200}$
- B) $y = 4(200)^x$
- C) $y = 200(x)^4$
- D) $y = 200(4)^x$

23

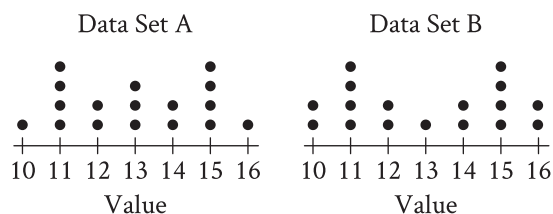
$$x^2 - 2x - 9 = 0$$

One solution to the given equation can be written as $1 + \sqrt{k}$, where k is a constant. What is the value of k ?

- A) 8
- B) 10
- C) 20
- D) 40

24

The dot plots represent the distributions of values in data sets A and B.



Which of the following statements must be true?

- I. The median of data set A is equal to the median of data set B.
 - II. The standard deviation of data set A is equal to the standard deviation of data set B.
- A) I only
 - B) II only
 - C) I and II
 - D) Neither I nor II

25

An isosceles right triangle has a perimeter of $94 + 94\sqrt{2}$ inches. What is the length, in inches, of one leg of this triangle?

- A) 47
- B) $47\sqrt{2}$
- C) 94
- D) $94\sqrt{2}$

26

$$-9x^2 + 30x + c = 0$$

In the given equation, c is a constant. The equation has exactly one solution. What is the value of c ?

- A) 3
- B) 0
- C) -25
- D) -53

27

$$\begin{aligned}\frac{3}{2}y - \frac{1}{4}x &= \frac{2}{3} - \frac{3}{2}y \\ \frac{1}{2}x + \frac{3}{2} &= py + \frac{9}{2}\end{aligned}$$

In the given system of equations, p is a constant. If the system has no solution, what is the value of p ?

STOP

**If you finish before time is called, you may check your work on this module only.
Do not turn to any other module in the test.**

No Test Material On This Page